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[REDACTED] EXAMINER

CAO, PHAT X

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 12/05/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/276,273

Applicant(s)

Lowrey et al.

Examiner

Phat X. Cao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on Sep 11, 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 40-83 is/are pending in the application.
- 4a) Of the above, claim(s) 40-43 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 44-83 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) All b) Some* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) Notice of References Cited (PTO-892) 18) Interview Summary (PTO-413) Paper No(s). _____
- 16) Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) Notice of Informal Patent Application (PTO-152)
- 17) Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) Other: _____

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DETAILED ACTION

1. The cancellation of claims 1-39 in Paper No. 11 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

3. Claims 44-46, 49-50, 51-53, 56-57, 58-60, 63-64, 65-67, 70-71, 72, 75-77, and 78 are rejected under 35 U.S.C. 102(e) as being anticipated by Gonzalez et al (US. 6,194,746).

Gonzalez, in Fig. 19, discloses a memory element, comprising: a conductive polysilicon layer 88; a first dielectric material and a second dielectric material 82, at least a portion of the conductive polysilicon layer 88 disposed between the first and second dielectric materials 82, wherein an edge portion of the conductive polysilicon layer 88 is a linear contact and exposed; and a programmable resistance material 87 made of chalcogen (column 8, lines 34-40) adjacent to the exposed edge portion.

4. Claims 44-46, 49-53, 56-60, 63-67, 70-73, 75-79, and 81-83 are rejected under 35 U.S.C. 102(e) as being anticipated by Ovshinsky (US. 5,687,112).

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Ovshinsky, in Fig. 2, discloses a memory element, comprising: a conductive sidewall spacer (34,14); a first dielectric material and a second dielectric material 18, at least a portion of the conductive sidewall spacer (34,14) disposed between the first and second dielectric materials 18, wherein an edge portion 16 of the conductive sidewall spacer (34,14) is exposed and wherein the conductive sidewall spacer (34,14) comprises a first conductive layer 34 disposed on the sidewall surface of the dielectric material 18 and the second conductive layer 14 disposed on the first conductive layer 34; and a programmable resistance material 36 made of chalcogen (column 9, lines 6-14) adjacent to the exposed edge portion 16. Ovshinsky ('112), in column 14, lines 35-40, further discloses that the conductive sidewall spacer (34,14) can be formed as planar, vertically disposed or horizontally disposed by having a conical, pyramidal, elongated or wedge-shaped.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 44-83 are rejected under 35 U.S.C. 102(b) as being anticipated by Ovshinsky et al (US. 5,414,271).

With respect to claims 44-46, 49-53, 56-60, 63-67, and 70-83, Ovshinsky et al disclose in Fig. 1 an electrically programmable, single-cell memory element, comprising: a volume of phase-change memory material 36 including chalcogen of Te or Se and made of TeGeSb (column 11,

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lines 28-35); and a first contact and a second contact for supplying an electrical signal to the memory material 36, the first contact comprising a conductive sidewall spacer (32,34) disposed between first and second dielectric materials 20, wherein the conductive sidewall spacer (32,34) has an edge exposed and adjacent to the memory material 36, and wherein the conductive sidewall spacer (32,34) comprises a first sidewall layer 32 deposited onto the sidewall surface and made of molybdenum (column 16, lines 31-34) which has less resistivity than the second sidewall layer 34 made of carbon (column 16, lines 34-35).

With respect to claims 47-48, 54-55, 61-62, and 68-69, Ovshinsky et al further discloses in Fig. 1 that the first contact layer (32,34) is substantially vertically and horizontally disposed, it has cup-like surface having an open end adjacent the memory material 36, and the area of contact between the first contact layer and the memory material is annular which encircles a cross-sectional slice of the memory material.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 73-74 and 79-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonzalez et al (US. 6,194,746).

As discussed in details above, Gonzalez's Fig. 19 substantially reads on the above claims, except that it does not disclose another conductive layer (corresponding to a first conductive layer as claimed) disposed under the conductive polysilicon layer 88 and having resistivity less than the resistivity of the conductive polysilicon layer 88.

However, Gonzalez further teaches in Fig. 13 the obviousness of forming a refractory metal silicide 34 under the conductive polysilicon layer 38 for the purpose of providing a low contact resistance (column 10, lines 42-46).

9. Claims 48, 55, 62, and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonzalez et al in view of Tanahashi (US. 6,064,084).

Gonzalez does not disclose that the conductive polysilicon layer 88 is a cup-shaped having an open end adjacent to the programmable resistance material 87.

However, Tanahashi teaches in Fig. 2C the obviousness of forming the conductive polysilicon layer 3 being cup shaped and having an opened end adjacent to the conductive material

5. Accordingly, it would have been obvious to modify the device structure of Gonzalez by forming the conductive polysilicon layer 88 with the structures as set forth above, because according to Tanahashi, such structures would provide the benefits of reducing the contact resistance of the polysilicon sidewall liner (column 3, lines 62-64).

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Response to Arguments

10. Applicant's arguments filed 9/11/01 have been fully considered but they are not persuasive.

With respect to independent claims 44 and 51, Applicant argues that Fig. 2 of Ovshinsky ('112) does not suggest the invention as claimed because Ovshinsky ('112) teaches conductive layer 34 disposed between another conductive layer 14 and a dielectric layer 18.

Applicant is noted that a conductive layer as claimed is interpreted as the combination of layers 34 and 14. Therefore, Fig. 2 of Ovshinsky ('112) clearly suggests the "conductive layer [34,14] disposed between said first and second dielectric materials [18]" as claimed.

With respect to independent claims 58, 65, 72 and 78, Applicant also argues that Fig. 2 of Ovshinsky ('112) does not suggest the invention as claimed because Ovshinsky's figure 2 shows a conductive layer 34 formed on another conductive layer 14, and dielectric layer 18 formed on conductive layer 34.

Applicant is also noted that a conductive layer as claimed is interpreted as the combination of layers 34 and 14. Therefore, Ovshinsky's figure 2 clearly suggests "a conductive sidewall spacer [34,14] disposed on said sidewall surface [18]; a second dielectric material [18] disposed on said conductive sidewall spacer [34,14]" as claimed.

With respect to Ovshinsky ('271), Applicant argues that Ovshinsky ('271) does not suggest the invention as claimed in independent claims 44, 51, 58, 65, 72 and 78 because Ovshinsky's figure 1 teaches a conductive layer 32 formed between the dielectric layer 20 and another conductive layer 34.

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Applicant is noted that a conductive layer as claimed is interpreted as the combination of layers 32 and 34. Therefore, Ovshinsky's figure 1 clearly suggests "said conductive layer [32,34] disposed between said first and second dielectric materials [20]".

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is (703) 308-4917. The Examiner can normally be reached on Monday through Thursday. If attempts to reach the Examiner by

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telephone are unsuccessfully, the Examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956. Group 2800 fax number is (703) 308-7722 or (703) 308-7724.



OLIK CHAUDHURI
SUPERVISORY PATENT EXAMINER
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PHAT X. CAO
PC
November 30, 2001